SMALL BEACH EROSION CONTROL PROJECT

OAK BLUFFS TOWN BEACH

MARTHA'S VINEYARD MASSACHUSETTS

DETAILED PROJECT REPORT

U.S. ARMY ENGINEER DIVISION, NEW ENGLAND
CORPS OF ENGINEERS WALTHAM, MASS.

12 AUGUST 1965

Rev. 12/17/65.. 78

DETAILED PROJECT REPORT

ON SMALL BEACH EROSION CONTROL PROJECT,

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MARTHA'S VINEYARD, MASSACHUSETTS

Table of Contents

APPENDICES

PLATES

U. S. ARMY ENGINEER DIVISION, NEW ENGLAND
CORPS OF ENGINEERS
424 Trapelo Road
Waltham, Mass. 02154

NEDED-R

12 August 1965

SUBJECT: Detailed Project Report on Small Beach Erosion Control Project, Oak Bluffs Town Beach, Martha's Vineyard, Massachusetts

TO: Chief of Engineers
ATTN: ENGCW-PD

SYLLABUS

This study pertains to Oak Bluffs Town Beach, which is located in the town of Oak Bluffs, on the east shore of the island of Martha's Vineyard, Massachusetts.

The purpose of this study is to develop a feasible plan of beach restoration and stabilization, to serve effectively as a protective and recreational beach.

The Division Engineer finds that erosion during frequent serious storms has resulted in a severe loss of beachfill. This has subjected the beach to overtopping by waves, and exposed shore structures and nearby development to damaging wave forces and tidal flooding.

The Division Engineer recommends that Federal participation in the cost of construction of a beach erosion control project for Oak Bluffs Town Beach be authorized by the Chief of Engineers under the provisions of Section 103 of the 1962 River and Harbor Act.

The project consists of widening 1200 feet of beach to a width ranging up to 200 feet at mean high water and construction of a terminal groin.

The presently estimated first cost of the project is $270,000, of which the Federal contribution is $155,000.

SMALL BEACH EROSION CONTROL PROJECT
OAK BLUFFS TOWN BEACH
MARTHA'S VINEYARD, MASSACHUSETTS

PART I - GENERAL

1. Authority. This study was made by the Corps of Engineers, United States Army, in extension of the concurrent cooperative beach erosion control study of the east shore of Martha's Vineyard, made in cooperation with the Commonwealth of Massachusetts (acting through the Department of Public Works, Division of Waterways). This small beach erosion control project study was authorized by the Chief of Engineers, Washington, D. C. by 1st indorsement dated 2 October 1964, subject: "Martha's Vineyard, Massachusetts, Small Beach Erosion Project", pursuant to the Small Beach Erosion Control Project authority provided by Section 103 of the 1962 River and Harbor Act.

2. Purpose. The purpose of the study is to determine the most practicable method to provide necessary beach erosion control for the Oak Bluffs Town Beach, and to furnish a much needed recreational beach. This report supplements the Beach Erosion Control Report on Cooperative Study of Martha's Vineyard, Massachusetts, dated 12 Aug. 1965. Consequently, it has a minimum of detail and is presented in a concise manner. It relies in a large part on the Cooperative Study Report and Appendices for much of the general information. Reference may be made to that Report and Appendices for additional information not covered in this report.

3. Prior Reports. There are no prior reports of beach erosion control for Martha's Vineyard. There are, however, several navigation studies which have been published. For a description of these studies see Paragraph 3, Prior Reports in the Cooperative Study Report.

4. Description. Oak Bluffs Town Beach is owned by and located in the town of Oak Bluffs, Dukes County, Martha's Vineyard, Massachusetts. It is about midway between Oak Bluffs Harbor entrance to the north and Harts Harbor entrance to the south.

Residential property, tourist homes and inns form the principal development directly behind the beach and landward of a shorefront road. Immediately adjoining the property and backing the northern portion of this beach is an attractive public park.

The beach is popular during the summer season. It is used to its maximum capacity by residents of the town of Oak Bluffs and by tourists who visit the Vineyard in great numbers during the summer months. Among the principal assets of the beach is a bathing pavilion and nearby parking facilities. Although it is within walking distance of the village proper, travel from more remote areas is principally by private conveyance.

5. Statement of the Problem and Improvements Desired. This area is directly exposed to wave forces during hurricanes and other serious storms. The seriousness of the problem is evident in that the original beach has eroded resulting in a beach with a present width at high tide of only 10 to 15 feet. This results in exposing the seawall and bathing pavilion to attack from wind-driven waves. Damage to the seawall with increased overtopping of the wall by waves would seriously affect the shorefront road and residential development directly behind it.

Local interests desire a wider beach to furnish some degree of protection and to provide additional area for recreational purposes. The present beach offers an inadequate area to accommodate present recreational use. The trend toward ever-increasing demand further increases the need for a wider beach area.

PART II - FACTORS PERTINENT TO THE PROBLEM

6. Geomorphology. The terminal moraine of Martha's Vineyard is underlain by sands and clays of the Coastal plain. Initially, the shoreline exhibited a coastal plain scalloped with numerous embayments resulting from partial submergence of shallow valleys cut in the surface plain. The most remarkable characteristics of the present shoreline is its rectilinear pattern.

Headlands have been eroded with baymouth bars extending between them, giving an excellent example of a submature shoreline of submergence. The stretch of shorefront at Oak Bluffs between Oak Bluffs Harbor and Farm Pond is one of these less prominent till headlands.

7. Littoral Materials. a. Characteristics. Samples of surface beach and nearshore materials were taken at Oak Bluffs Town Beach. The littoral materials were found to be on the coarse side, not too satisfactory for recreational beach requirements.

Predominant erosion processes for this area lead to sorting characteristics which cause the material to be out of adjustment with its environment. Detailed information on the characteristics of the beach material is presented in Appendix C of the Cooperative Report including tabulated sand sample data.

b. Sources. The unconsolidated glacial deposits which overlie the coastal plain and headlands are the chief source of supply for the beaches. The original source of material for Oak Bluffs Town Beach was that which eroded from the shorefront to the north including the predominant headland at East Chop. The construction of shorefront protective structures including jetties at harbor entrances has greatly diminished this source of supply.

Suitable material in sufficient quantities to construct the beach are available in nearby ponds or as overburden on the island. Surface sampling of beach and nearshore locations indicate that suitable offshore material exists in Nantucket Sound.

8. Littoral Forces. a. Waves. Wave studies based on hindcast data indicate that waves occur with the greatest frequency from the east, northeast, and east. The beach area is directly exposed to waves generated in the Atlantic Ocean which can pass through an 11-mile opening

between Monomoy Point and Nantucket Island about 27 miles away. These waves would be the maximum experienced in this area. Lesser waves can be generated within Nantucket Sound between the Island and the mainland. In all conditions, wave heights are reduced because of shoal conditions within Nantucket Sound.

b. Currents. The tidal currents within Vineyard Sound flood to the east and ebb to the west. An inspection of the Tidal Current Tables published by the United States Coast and Geodetic Survey indicate that these velocities within the immediate area would not exceed 1 knot. The tidal currents increase appreciably in narrower areas of the Sound. In the constricted area north of East Chop tidal current velocities average as high as 3.1 knots.

c. Winds. A study was made of the United States Weather Bureau wind records for Nantucket Island, Massachusetts. This island is located about 28 miles east-southeast of the study area. The study showed that the prevailing winds are from the west, or offshore at the study area. Predominant onshore winds are from the northeast quadrant. Approximately 47 percent of the duration of all storm winds occur from the northeast quadrant.

d. Storms. A study was made of United States Weather Bureau records for 10 years of storms having a continuous duration of at least four hours and a wind speed of 30 miles per hour or higher. It was found that there has been a high frequency of storms from the northeast direction. These storms are usually accompanied with moderate rain or snow fall. They are quite often of long duration extending through several high tides and usually cause serious flooding of lowlands and continuous erosive processes and damage to structures from wind-driven waves.

e. Tides. Tides are semi-diurnal. The mean range is 1.7 feet at Oak Bluffs and the spring range is 2.0 feet. Tides with an elevation of 3.0 feet above mean high water occur with a frequency of once a year. The highest known tide for this area, estimated at 9.0 feet above mean low water, occurred during hurricane "Carol", August 31, 1954.

9. Shore History. a. Shoreline and Offshore Changes. The U.S. Coast and Geodetic Survey, the Corps of Engineers, U.S. Army, and the Mass. Department of Public Works have made hydrographic surveys in this area at various times between 1845 and 1962. A

comparison of the surveys show a general high water shoreline recession of as much as 100 feet. Offshore depth changes consist principally of deepening. This becomes quite evident in a study of the 12-foot and 18-foot contours. These contours show a landward movement of up to 400 feet between 1928 and 1962. See Appendix F of the Cooperative Report for more detailed information.

b. Prior Corrective Action and Existing Structures. Over the years, construction of various types of protective works has been undertaken for this area. A concrete seawall constructed in stages by the Commonwealth, extends along the shorefront. This wall has rock revetment fronting the toe. Rock revetment also extends along the front of and around the exposed ends of the bathing pavilion. Timber groins in various stages of deterioration are scattered throughout the beach area. Two stone groins in fair to good condition are located near the extremities of the public beach.

c. Profiles. Beach profiles were surveyed for 20 locations during 1962 for use in the overall study. Profiles numbered 4, 5, 6 and 7 cover the subject beach area. For the locations and plots of the profiles see Plate 2 and Plates 5 and 6 respectively in the Cooperative Study Report. Inspection of the profiles reveals berm formation immediately offshore and some steepening of the beach foreshore which is indicative of the rough wave action the beach is subjected to during serious storms.

d. Volumetric Accretion and Erosion. The jetties and other shorefront structures north of this beach area have interrupted the natural and predominantly southerly drift of materials essential for beach replenishment. Based on comparative surveys, it is estimated that about 10,000 cubic yards of sand are lost annually from the Town Beach.

PART III - ANALYSIS OF THE PROBLEM

10. Shore Processes Pertinent to the Problem. The shorefront of Martha's Vineyard has been and is continuing to be molded into a rectilinear type pattern. This becomes quite apparent in observing the extensive formation of baymouth bars across embayments located between headlands. These headlands have been cut back and furnish the material essential for the growth and existence of these bars.

The Oak Bluffs Town Beach is actually located along one of these flattened headlands. It is continuously experiencing serious erosion. The construction of protective structures such as shorefront revetment, jetties and groins to control erosion have interrupted the supply of material essential for the existence of the beach.

The erosion processes occur as a result of short period waves which are experienced during serious high level storms. The beach is overtopped by waves resulting in a subsequent loss of material over the entire existing narrow beach width, thus jeopardizing the seawall backing the beach. Although there is some recovery of material during swells which occur during calm periods, the filling period is insufficient to balance losses or to provide a suitable bathing beach during the recreational season.

Continuation of the processes of erosion without corrective measures will result in a complete loss of beach and greatly jeopardize existing shorefront structures and development.

11. Methods of Correcting Problem Conditions. The most practical method for correcting the serious losses of material at this beach is by beach restoration. There is a sufficient quantity of material of suitable characteristics within convenient haul distance located either in the small ponds or at inland locations. The beach restoration would require a groin at the southernmost limits of the beach to prevent large losses of material during storms. This is because of the southerly littoral drift which is a dominant factor in the erosion processes depleting this beach area. Landward movement of the material will be prevented by the existing seawall which extends for the full length of the beach and acts as a backstop. The beach raising and widening will afford practical protection to the seawall and offer some reduction in overtopping of the wall by waves and flooding of the shore road and development landward of the road.

12. Design Criteria. The proposed method of protection is designed to furnish protection from the more frequent storms. Although

it will not afford complete protection from the less frequent higher level storms and hurricanes, it, nevertheless, will provide a substantial degree of protection under such conditions. Pertinent design criteria is described below:

a. Design Tide. The design tide is 4.7 feet above mean low water (3.0 above mean high water). This is the tide which has been determined to occur on the average of about once a year.

b. Design Wave. The design wave height was determined by the forecasting method for shallow waves by Thysse and Schiff as described in Technical Report No. 4 of the Beach Erosion Board. A wave height of 9.5 feet from the east was used for design of structures in depths of water sufficient to support such a wave. For shallower depths, a design wave height equal to the depth divided by 1.28 was utilized.

c. Sizes and Slopes of Armor Stones in Structures. Sizes and slopes of armor stone in the groin are computed in accordance with the formula developed by the U.S. Army Waterways Experiment Station and described in EM 1110-2-2904, dated 30 April 1963, entitled "Engineering and Design, Design of Breakwaters and Jetties."

d. Sand Fill. The top elevation, beach width, and slopes of proposed sand fill are based on existing beaches. The top elevation is 7.7 feet above mean low water which furnishes 3 feet of freeboard above the design tide level. The beach slope varies from 1 on 15 above mean low water to 1 on 30 below. The beachfill can be placed on a slightly steeper slope and allowed to assume its natural slope under wave action. In general, this furnishes a beach width of greater than 150 feet above the highwater shoreline. The sandfill should have a median diameter of not less than 0.4 mm consistent with practical and economic limits. Maximum diameters can range as high as 2 mm and still remain within the classification of medium beach sand satisfactory for bathing purposes. In an exposed area subject to frequent moderate wave action this grade of sand fill should be shaped through natural wave processes to attain average slopes no flatter than specified in the design, and minimize offshore losses. For the purpose of detailed design of the beach fill, investigations of materials in borrow areas should be made when plans and specifications are being prepared.

PART IV - PLAN OF IMPROVEMENT

13. General. A type of protection has been developed for the Oak Bluffs Town Beach which can best meet the needs for the area. The design is complicated by the topographical features and geological make-up of the area. However, care has been taken to employ design procedures which will adequately cope with the problem.

14. Description. The plan of protection, as shown on Plate 1, consists of beach raising and widening along 1200 feet of shorefront in the vicinity of the Oak Bluffs Town Beach pavilion and bathhouse. The beach is of variable width above the high water shoreline. Maximum beach width is provided in front of the areas of most intensive development. Beach widths from the high water shoreline gradually taper from a maximum of 200 feet to the existing shoreline at the north end of the project. Restoration of this portion of the beach will result in an unnatural projection along the shorefront and an increase in the natural erosion processes, which presently include a substantial and predominant southerly drift. Therefore, the construction of an impermeable stone groin at the southern extremity of the beach is required to hold the projecting beach. Without the terminal groin, it is estimated that as much as one-third of the beach fill, (about 30,000 cubic yards) would be lost annually. Even with this groin, it is considered that significant losses of beach material will occur during serious storms. Therefore, provision for annual maintenance of the beach has been included in the design and annual maintenance cost of the project.

PART V - ECONOMIC ANALYSIS

15. General. Major details pertaining to the economics of the project are given in Appendices H and I of the Beach Erosion Control Report on the Cooperative Study of Martha's Vineyard, Massachusetts. Cost estimates are based on the prevailing 1965 price level.

16. First Cost. The first cost of the project is based on sand fill being obtained locally either by dredging from nearby ponds or by trucking from nearby land fill sources. The armor stone for the groin will be obtained from mainland sources. The first cost of the project is tabulated in the table below.

Item	Estimated Quantity	Unit	Unit Cost	Estimated Amount
Beach fill	84,000	C.Y.	$ 1.10	$ 92,400
Groin	8,400	Tons	14.00	117,600
Contingencies				31,000
		Sub-Total		$ 241,000
Engineering & Design				7,000
		Sub-Total		$ 248,000
Supervision & Administration				22,000
		TOTAL FIRST COST		$ 270,000
Federal Share 57.5%				155,000
Non-Federal Share 42.5%				115,000

17. Annual Charges. The Federal investment cost is computed at 50% of the first cost of construction for that portion of the beach south of the municipally-owned Ocean Park. For the portion of the beach fronting the park, a Federal investment of 70 percent is used. Federal and non-Federal interest is computed at the rate of 3-1/8 percent. A useful project life of 50 years is used for the determination of amortization charges. It is considered that the groin construction will reduce the loss of beach fill to about fifty percent of what would occur at this projecting beach without a groin. On this basis, annual charges are included sufficient to provide annual loss of about 18 percent of the initial beach fill, or 15,000 cubic yards of beach

nourishment annually. It is estimated that the annual cost of maintenance of the groin will amount to about five percent of the first cost of the structure.

For details of the annual charges see the table below.

ANNUAL CHARGES

Item	Federal	Federal	Total
Interest	$4900	$ 3500	$ 8400
Amortization	1300	1000	2300
Maintenance, Groin	--	5800	5800
Beach Maintenance	--	22500	22500
Total	$6200	$32800	$39000

18. Benefits. The benefits are based on the realization of increased recreational use and direct damages prevented to existing structures and development backing the beach. The beach raising and widening increases the present capacity from 350 to 4200 persons, allowing 75 square feet per user. The monetary recreational benefit is based on the savings in transportation costs. ($0.70 round trip fare), to users from the Towns of Oak Bluffs and Tisbury by utilizing this beach instead of the more remote State Beach at Sengekontacket Pond. Vineyard Haven Town Beach is one other small beach located in the town of Tisbury. Of the three beaches, however, Oak Bluffs Town Beach is the only one furnishing a bathhouse, sanitary facilities, a cafeteria for the use of bathers and nearby parking facilities.

It is estimated that on a peak day, 50 percent of all transients and vacationers who do not have access to private beaches, and 15 percent of the permanent residents of these towns would use these three beaches. It is further estimated that, after improvement, on a peak day, 50 percent of these beach patrons would utilize Oak Bluffs Town Beach. Based on the permanent population of these two towns, combined with the summer transients and vacationers, it has been determined that there would be a peak day attendance of about 3600 bathers at Oak Bluffs Town Beach.

The number of present and prospective beach users in excess of the present beach capacity is based on actual attendance records for a similar use beach at Eastern Point, Groton, Connecticut. Using this data, a beach distribution curve has been prepared for Oak Bluffs

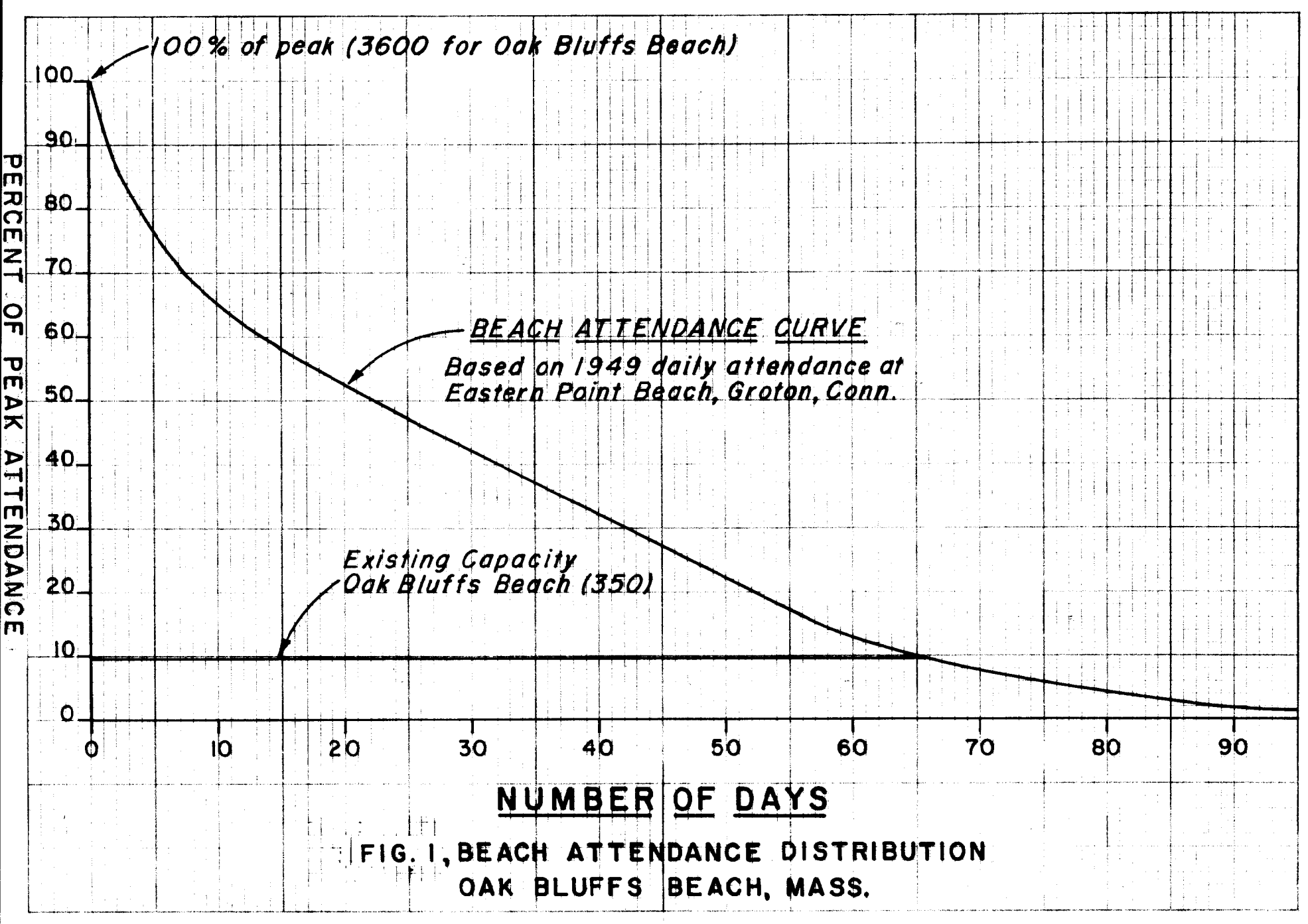


FIG. 1, BEACH ATTENDANCE DISTRIBUTION
OAK BLUFFS BEACH, MASS.

Town Beach and is shown on Figure 1. The number of present and prospective beach users in excess of the present beach capacity at Oak Bluffs Town Beach is determined from this curve. The distribution curve is a plot of percentage of peak attendance as related to the number of days in the bathing season. From Figure 1, using a peak attendance of 3600 persons, the beach attendance in excess of the existing beach capacity is determined from Figure 1 as follows:

Attendance in Excess of Existing Capacity (Peak 3600)

Day	% of Peak	No. of Persons*	No. Days	Avg. No. Persons	Total
65	9.7	0			
			5	50	250
60	12.5	100			
			35	720	25,200
25	47.0	1340			
			11	1,555	17,105
14	59.0	1770			
			4	1,870	7,480
10	64.5	1970			
			3	2,070	6,210
7	70.0	2170			
			4	2,385	9,540
3	82.0	2600			
			3	2,925	8,775
0	100.0	3250			
					74,560

*Percentage of peak minus existing beach capacity (350)

The monetary annual recreational benefits for the anticipated attendance in excess of the present beach is computed at $.70 per person. For the total excess of 74,560 persons, this totals $52,200.

It is estimated that the average annual direct damages prevented by the improvement, primarily reduction in road repair would amount to $1200. This results in total annual benefits of $53,400.

For more detailed information, see Appendix I, Estimates of Benefits of Improvement for the Beach Erosion Control Report on Cooperative Study of Martha's Vineyard, Massachusetts.

19. Interests. There are no direct interests to the United States as a landowner, since none of the shore is owned by the United States. Non-Federal public interest is defined as:

a. The benefits accruing to a State or political subdivision thereof as a landowner.

b. The benefits accruing to the general public through public use of either public or private property or from protection of nearby public property.

Private interest is defined as the benefits derived by individuals or non-public groups of individuals on account of ownership of lands and business enterprises affected. All estimated benefits resulting from this project are classified as non-Federal public benefits.

20. Justification. The estimated annual benefits and costs and the resulting ratio of benefits to costs for the project are given below:

Project	Estimated Annual Benefits	Estimated Annual Costs	Ratio of Benefits to Costs
Oak Bluffs Town Beach	$53,400	$39,000	1.4

21. Apportionment of Costs. The policy of Federal aid for the restoration and protection against erosion of the shores of the United States, its territories, and possessions, was established by Public Law 826, 84th Congress, as amended by Public Law 87-874 (River and Harbor Act of 23 October 1962). Usually investigations to consider eligibility of such plans for Federal aid in construction are authorized by resolution of the Public Works Committee of either the Senate or House of Representatives. However, in the case of small projects in which the Federal share of costs would be less than $500,000, the investigation and recommended project may be approved by the Chief of Engineers.

The policy of Federal participation in costs of constructions of shore stabilization and protection projects for non-Federal publicly-owned shores is usually one-half of such costs. For the case of Non-Federal publicly-owned shores meeting criteria for parks and conservation areas, the level of Federal participation can be increased to not more than 70 percent. The criteria for projects to be eligible

for a 70 percent Federal share require that the project must (a) include a zone which excludes permanent human habitation, (b) include, but not be limited to, recreational beaches; (c) satisfy adequate criteria for conservation and development of the natural resources of the environment; (d) extend landward a sufficient distance to include where appropriate, protective dunes, bluffs or other natural features which serve to protect the uplands from damage; and (e) provide essentially full park facilities for appropriate public use.

The recommended project consists of a public beach 1200 feet long, constructed of sand fill and with a terminal groin at its southern end. The northern 450 feet of the beach fronts Ocean Beach Park, a public park which extends landward a distance of 500 to 700 feet from the beach. This park is developed for public use and enjoyment and serves as a temporary habitat for migratory birds and waterfowl. The Division Engineer considers that the portion of the beach fronting the park complies with the required conditions in Section 103 of Public Law 87-874 which established 70 percent Federal participation in the cost of construction of projects for protection of parks and conservation areas. The southern 750 feet fronts a shore road which is seaward of private habitation. This part of the project is considered eligible for 50 percent Federal participation on the first cost of construction.

The Federal participation in the cost of construction of the project is computed to reflect the nature of land ownership. Based on this, the percentage of Federal participation in the cost of construction of the entire project is determined to be 57.5 percent. No Federal contribution is authorized in the cost of maintenance of the project.

22. Coordination with and Comments of Other Agencies and Local Interests. Close coordination has been maintained with other Federal agencies and State and local interests. This has continued during the development of the cooperative study for Martha's Vineyard which includes this area. Substantial information has been obtained which has been of great value in the preparation of this report.

The Division of Waterways of the Massachusetts Department of Public Works stated that the plan of improvement for Oak Bluffs Town Beach had their complete support. The Town of Oak Bluffs indicated complete cooperation in the construction of this project.

The Massachusetts Division of Fisheries and Game advised that the study has no adverse effects on the fish and wildlife resources within the proposed project area. They consider that the groin constructed with a suitable walking surface for sport fishermen, will greatly enhance the recreational utilization of the fishery resources. The U. S. Fish and Wildlife Service furnished a conservation and development report prepared in cooperation with the Massachusetts Division of Marine Fisheries and Division of Fisheries and Game. This report is printed as Appendix L in the Cooperative Beach Erosion Control Report for Martha's Vineyard, Massachusetts. Pertinent comments from that report relating to the plan of improvement are as follows:

a. "Placing sand fill upon the beach would have no effect upon fish and wildlife resources. We understand that sand fill is available from inland sources. Use of inland sources would have little effect upon fish and wildlife resources. Indiscriminate dredging for sand fill from Farm Pond or Sengekontacket Pond would result in damages to soft clam, bay scallops, quahog and waterfowl resources. It is possible, however, that dredging, under supervision of the Massachusetts Division of Marine Fisheries, of the flats near Sarson Island in Sengekontacket Pond could result in establishment of scallops there and improvement of circulation throughout most of the Pond, without significant damages to waterfowl or other resources."

b. "Construction of the groin would have no significant effect upon fish and wildlife resources. The surface of the outer end of the new groin would be only one-foot above mean low water and it would be submerged or awash most of the time. The shoreward end would be 8.7 feet above mean low water and surrounded by sandfill. A portion of the seaward sloping section of the groin which is above wave levels would permit some fisherman use which is expected to be equivalent to present use of the area. The groin is expected to trap sand on its north side so that some fishing could continue to the south side of the groin for an indefinite period."

PART VI - CONCLUSIONS AND RECOMMENDATIONS

23. Conclusions. The Division Engineer concludes that the following plan, as shown on Plate 1, is the most practical method of restoration and protection for the Oak Bluffs Town Beach. The plan of improvement consists of construction of a 530-foot long impermeable terminal groin and widening 1200 feet of beach by direct placement of sandfill to provide a beach 200 feet wide above mean high water at the groin becoming 150 feet wide, 750 feet north of the groin, thence decreasing gradually northward along the remaining 450 feet.

To assure full effectiveness of the improvements during the life of the project, it is necessary to maintain the beach and groin periodically.

24. Recommendations. The Division Engineer recommends that a beach erosion control project be authorized for Oak Bluffs Town Beach under the provisions of Section 103 of the River and Harbor Act of 1962. The plan consists of widening 1200 feet of beach by direct placement of sand fill to a width ranging from 200 to 150 feet to mean high water along its southerly 750 feet decreasing gradually northward along the remaining 450 feet and construction of a 530-foot long impermeable terminal groin at the southern extremity of the beach.

The presently estimated first cost of the project is $270,000 to be borne jointly by the United States and local interests. The Federal share of project construction cost, in accordance with existing law, is established at 57.5 percent, or $155,000 based on the present cost estimate.

The recommended Federal participation is subject to the conditions that local interests will:

a. Contribute in cash 42.5 percent of the project construction cost, such contribution presently estimated at $115,000.

b. Assure continued public ownership and use of the shore and its administration for public use during the economic life of the project including free and direct access to the beach from Sea View Avenue, also assure continuation of the Ocean Park Section as a Park and conservation area.

c. Assure the performance of the maintenance and repair of the project during its economic life as may be required to serve the intended purpose.

d. Assure that water pollution that would endanger the health of bathers will not be permitted.

e. Hold and save the United States free from damages due to construction of the project.

2 Incls.
1. Appendix
2. Plate

R. R. PLOGER
Brigadier General, USA
Division Engineer

APPENDIX A

ENGCW-PD (28 Sept 64) 1st Ind
SUBJECT: Martha's Vineyard, Massachusetts, Small Beach Erosion Project

Office, Chief of Engineers, Washington 25, D. C., 2 October 1964

TO: Division Engineer, U. S. Army Engineer Division, New England
WALTHAM, MASSACHUSETTS 02154

1. Further detailed study of a prospective beach erosion project at Martha's Vineyard, Massachusetts, is authorized under the Small Beach Erosion Project program established by Section 103 of the 1962 River and Harbor Act. Preparation of a Detailed Project Report will be in accordance with ER 1165-2-13.

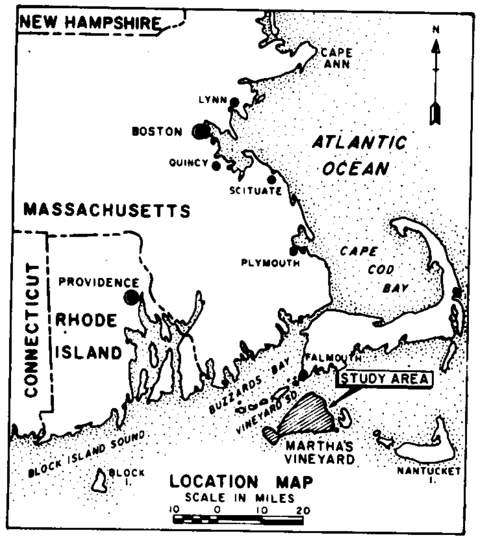
2. The following work allowance is established to cover preparation of a Detailed Project Report pursuant to the small beach erosion control project authority provided by Section 103 of the 1962 River and Harbor Act:

Location	Code 902-	Amount
Martha's Vineyard, Mass.	420	$3,000

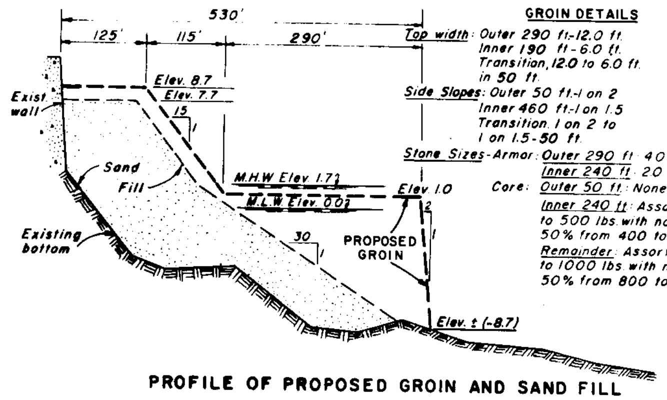
3. Allotment of $3,000 under appropriation 96X3122 Construction, General will be sent by separate communication.

FOR THE CHIEF OF ENGINEERS:

/s/ Crawford Young
CRAWFORD YOUNG
Colonel, Corps of Engineers
Assistant Director of Civil Works
for Atlantic Divisions

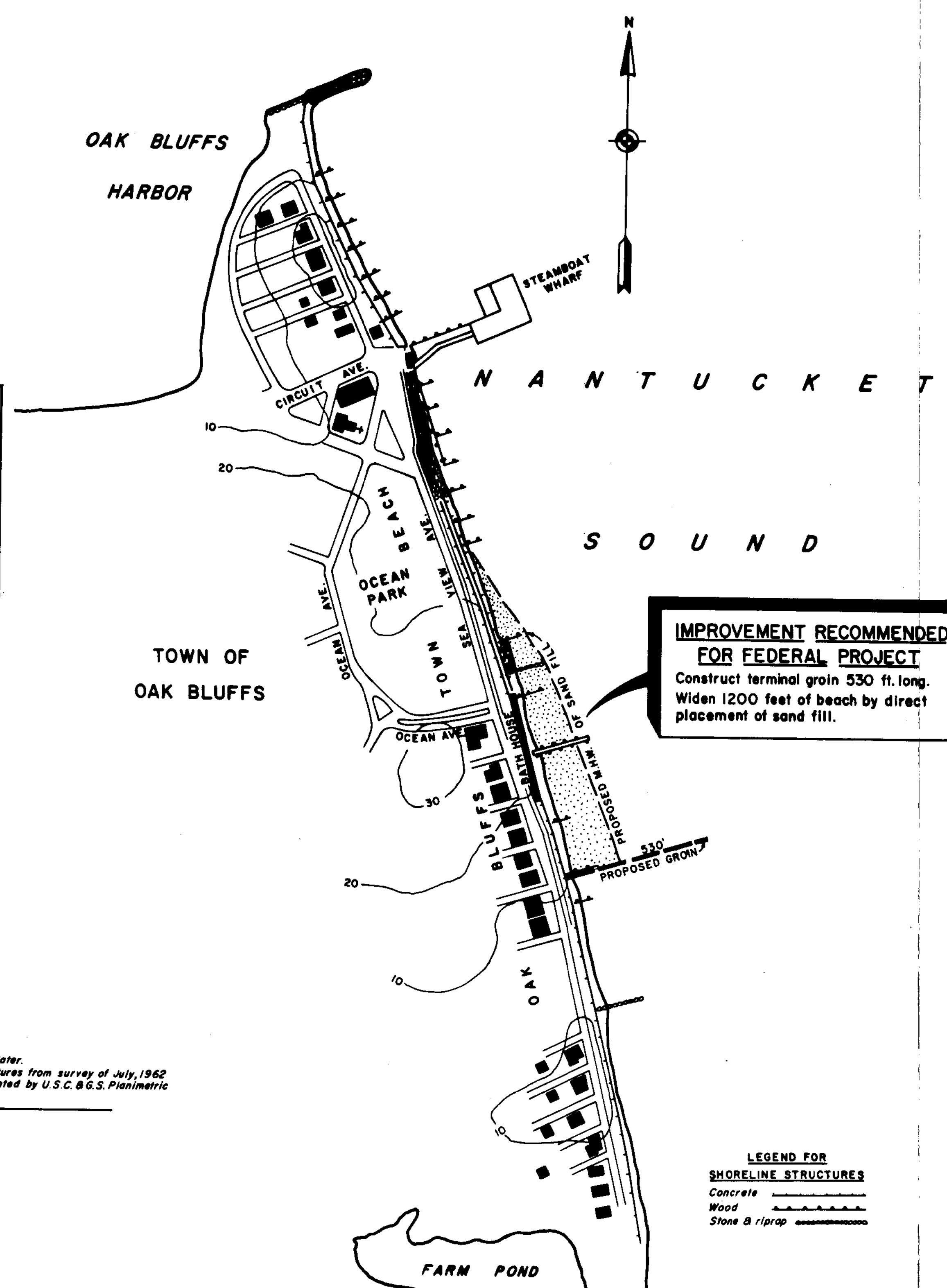


LOCATION MAP
SCALE IN MILES
10 0 10 20



GROIN DETAILS
Top width: Outer 290 ft.-12.0 ft. Inner 190 ft.-6.0 ft. Transition, 12.0 to 6.0 ft. in 50 ft.
Side Slopes: Outer 50 ft.-1 on 2 Inner 460 ft.-1 on 1.5 Transition. 1 on 2 to 1 on 1.5-50 ft.
Stone Sizes-Armor: Outer 290 ft: 4.0 to 5.0 tons
Inner 240 ft: 2.0 to 2.5 tons
Core: Outer 50 ft: None
Inner 240 ft: Assorted sizes up to 500 lbs. with not less than 50% from 400 to 500 lbs.
Remainder: Assorted sizes up to 1000 lbs. with not less than 50% from 800 to 1000 lbs.

PROFILE OF PROPOSED GROIN AND SAND FILL
AT OAK BLUFFS TOWN BEACH
SCALE IN FEET
HOR.- 100 0 100 200 300
5 0 5 10 15-VER.



IMPROVEMENT RECOMMENDED FOR FEDERAL PROJECT

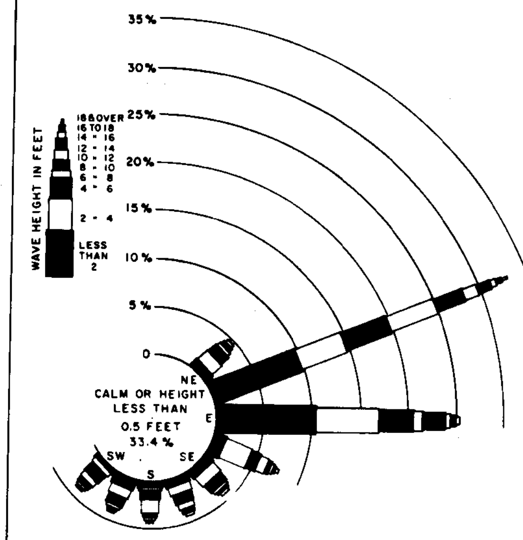
Construct terminal groin 530 ft. long.
Widen 1200 feet of beach by direct placement of sand fill.

GENERAL NOTES:

Shoreline is Mean High Water.
Shoreline and shore structures from survey of July, 1962 by Corps of Engrs., supplemented by U.S.C.&G.S. Planimetric Maps of 1949 and 1955.
M.H.W. shown thus: ————

LEGEND FOR SHORELINE STRUCTURES
Concrete
Wood
Stone & riprap

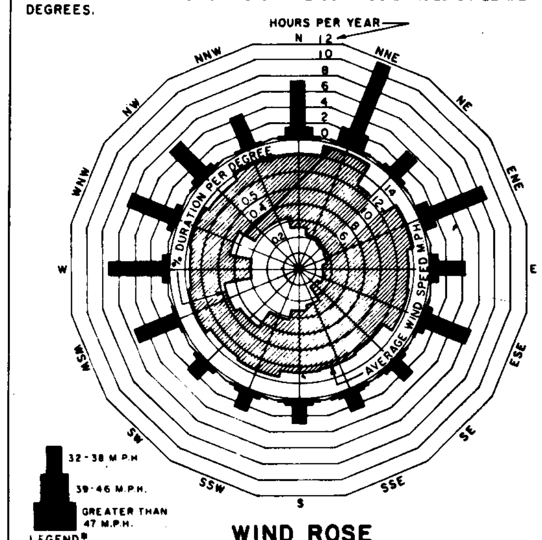
COMPOSED OF DATA OBTAINED BY HINDCAST OF 3 YEARS OF WIND RECORDS (1948-1950) SHOWING PERCENT OF TIME WAVES OF DIFFERENT HEIGHT OCCUR FROM EACH DIRECTION. FROM BEACH EROSION BOARD TECH. MEMO. NO. 55.



WAVE ROSE
OFF NAUSET BEACH, CAPE COD, MASS.
(LAT. 41° 50' N, LONG. 69° 30' W)

*DURATION FOR EACH RANGE OF WIND SPEEDS IS MEASURED OUTWARD FROM TOP OF UNDERLYING BAR GRAPH.

NOTE:
PERCENT DURATION PER DEGREE IS THE AVERAGE PERCENT DURATION OBSERVED FOR EACH 16 POINTS OF THE COMPASS DIVIDED BY 22 1/2 DEGREES.



WIND ROSE
MEMORIAL AIRPORT, NANTUCKET, MASS.
AUGUST 1952-JULY 1957 AUGUST 1958-JULY 1960
AUGUST 1961-JULY 1962
8 YEAR RECORD

U.S. ARMY ENGINEER DIVISION, NEW ENGLAND
CORPS OF ENGINEERS, WALTHAM, MASS.

BEACH EROSION CONTROL STUDY
OF OAK BLUFFS TOWN BEACH
MARTHA'S VINEYARD MASSACHUSETTS
SHEET 1 OF 1 PLAN OF PROTECTION MARCH, 1965
SCALE IN FEET
200 0 200 400 600

APPROVED: [signature]
CHIEF, ENGINEERING DIVISION
SUBMITTED: [signature]
CHIEF, PLANNING AND REPORTS BRANCH
[signature] F. W. Hogarty
CHIEF, RIVER AND HARBOR SECTION
[signature] C. E. Wentworth
PROJECT ENGINEER
DR. BY/A.D.C.
TR. BY/A.D.C.
CH. BY:

TRANSMITTED WITH REPORT DATED: AUGUST 12, 1965

FILE NO. B.E.MASS. 46